Service instructions

for contractors

Vitocrossal 200
Type CM2
Gas condensing boiler with MatriX radiant burner

For applicability, see the last page

VITOCROSSAL 200

5692 907 GB 12/2011

Please keep safe.

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

Danger
This symbol warns against the risk of injury.

Please note
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively designed for qualified personnel.
- Work on gas equipment must only be carried out by a qualified gas fitter.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations,
- all current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards,
- Gas Safety (Installation & Use) Regulations
  - the appropriate Building Regulation either the Building regulations, the Building Regulation (Scotland), Building Regulations (Northern Ireland),
  - the Water Fittings Regulation or Water Bylaws in Scotland,
  - the current I.E.E. Wiring Regulations.

If you smell gas

Danger
Escaping gas can lead to explosions which may result in serious injury.
- Never smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances ON or OFF.
- Close the gas shut-off valve.
- Open windows and doors.
- Remove all people from the danger zone.
- Notify your gas or electricity supplier from outside the building.
- Shut off the electricity supply to the building from a safe place (outside the building).

Safety instructions (cont.)

If you smell flue gas

Danger
Flue gas can lead to life-threatening poisoning.
- Shut down the heating system.
- Ventilate the boiler room.
- Close all doors leading to the living space.

Working on the system

- When using gas as fuel, also close the main gas shut-off valve and safeguard against unauthorised reopening.
- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

Please note
Electronic modules can be damaged by electro-static discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

Repair work

Please note
Repairing components which fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

Ancillary components, spare and wearing parts

Please note
Spare and wearing parts which have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications/conversion can compromise safety and may invalidate our warranty. For replacements, use only original spare parts from Viessmann or those which are approved by Viessmann.

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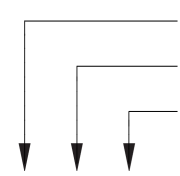
Steps – commissioning, inspection and maintenance

For further information regarding the individual steps, see the page indicated



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Further details regarding the individual steps

Checking the high limit safety cut-out setting

Never set the high limit safety cut-out higher than 110 °C, set it to a maximum of 110 °C if required.

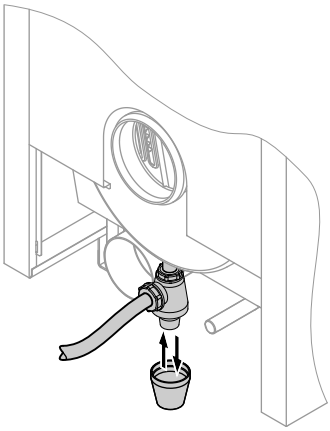
Control unit installation and service instructions

Filling the heating system with water and venting the system

Record the fill volume, water hardness and pH value on page 29 and 30.

Note
Observe the "Water quality requirements" on page 62.

Filling the siphon with water



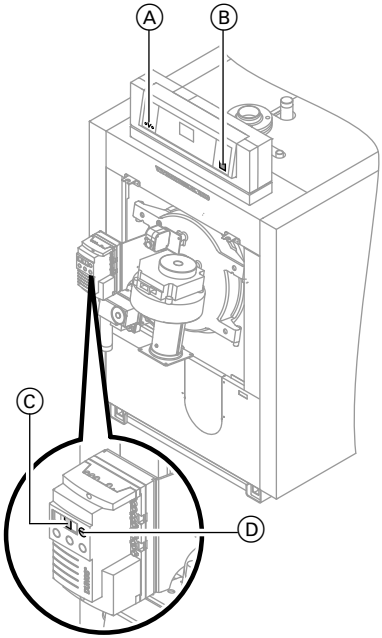
1. Undo the siphon and fill with water (otherwise flue gas may escape).
2. Check that the condensate can drain freely.
3. Refit the siphon.

Commissioning the system

Control unit operating and service instructions, and neutralising system operating instructions

1. Check the heating system pressure. Permissible boiler operating pressure: 4 bar

Further details regarding the individual steps (cont.)



2. For open flue operation: Check that the vents in the installation room are open.

3. Check the gas supply pressure.

4. Open the gas line shut-off valves.

5. Switch ON the mains isolator (outside the installation room).

6. Switch ON system ON/OFF switch Ⓑ at the control unit. If fault indicator lamp Ⓐ on the control unit illuminates and burner control unit display Ⓒ flashes, initially press reset button Ⓓ on the burner control unit.

   Note
   The system can enter a fault state during commissioning if there is insufficient gas in the supply line (the fault indicator on the control unit illuminates). Vent the gas pipe again and reset the burner control unit.

7. Set the code at the boiler control unit according to the table on page 55.

   Control unit installation and service instructions

8. Check the function of the neutralising system.

   Neutralising system operating instructions

Further details regarding the individual steps (cont.)

9. Check all gaskets and plugs, and retighten if necessary.

Note
We recommend you check all connections on the heating water side for leaks after approx. 500 hours run (see page 22).

10. Check the boiler door and cleaning cover a few days after commissioning and retighten all screws.

Danger
For safe operation, a minimum operating pressure of 0.5 bar is essential.
For this, a minimum pressure switch can be used.

Checking the gas type

1. Determine the gas type and Wobbe index (Wo) from your gas supply utility.
- With the natural gas E setting, the boiler can be operated in the Wobbe index range 12.0 to 16.1 kWh/m^3 (43.2 to 58.0 MJ/m^3).
- With the natural gas LL setting, the boiler can be operated in the Wobbe index range 10.0 to 13.1 kWh/m^3 (36.0 to 47.2 MJ/m^3).

2. In the delivered condition, the burner is set up for natural gas E. If required, convert the burner to a different gas type in accordance with details provided by your gas supply utility (see page 9).

3. Record the gas type in the service report (on page 61).

Converting to natural gas LL

(not in (A) and (CH))

Conversion for 87 kW

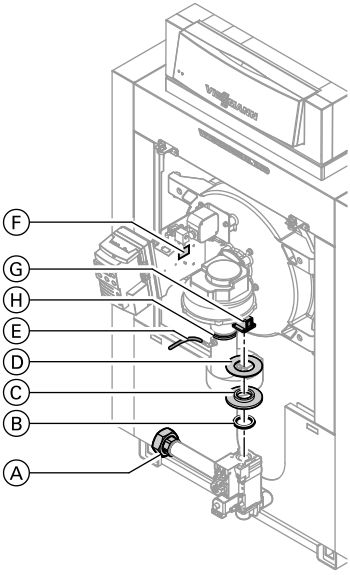
1. Close the gas shut-off valve.

2. Switch OFF the system ON/OFF switch at the control unit.

Further details regarding the individual steps (cont.)

3. Switch OFF the mains isolator (outside the installation room) or the power supply and prevent unauthorised reconnection.

4. Undo fitting Ⓐ.



5. Remove Venturi mixing pipe Ⓗ from the gas fan.
   Pull off the compensation line Ⓔ when the boiler is in balanced flue operation.

6. Undo the gas train from flange Ⓖ.

7. Remove restrictor Ⓒ with gasket Ⓓ from Venturi mixing pipe Ⓗ.

8. Secure the gas train (without restrictor Ⓒ and without gasket Ⓓ, but including O-ring Ⓑ) at flange Ⓖ.

9. Secure Venturi mixing pipe Ⓗ at the gas fan.
   Connect compensation line Ⓔ when the boiler is in balanced flue operation.

10. Secure fitting Ⓐ.

11. Affix supplied label "Set to..." Ⓕ over the existing label.

12. Start the burner (see page 7).

Danger
Escaping gas leads to a risk of explosion.
Check all fittings for gas tightness.

Please note
The use of leak detection spray can result in incorrect functions.
Leak detection spray must not come into contact with electrical contacts.

Conversion for 115 to 311 kW

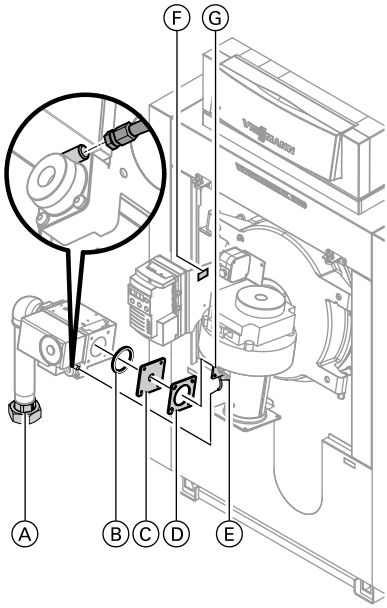
1. Close the gas shut-off valve.

2. Switch OFF the system ON/OFF switch at the control unit.

3. Switch OFF the mains isolator (outside the installation room) or the power supply and prevent unauthorised reconnection.

Further details regarding the individual steps (cont.)

4. Undo fitting Ⓐ.



5. Except for 115 kW: Pull compensation hose Ⓖ from the gas train.

6. Release the gas train from flange Ⓔ.

7. Remove restrictor Ⓒ with rubber cork gasket Ⓓ.

8. Secure the gas train (without restrictor Ⓒ and without rubber cork gasket Ⓓ, but including O-ring Ⓑ) to flange Ⓔ; replace the factory-fitted M 5 × 16 screws with M 5 × 12 (in the pack).

9. Secure fitting Ⓐ.

10. Except for 115 kW: Push compensation hose Ⓖ on to the gas train.

11. Affix supplied label "Set to..." Ⓕ over the existing label.

12. Start the burner (see page 7).

Danger
Escaping gas leads to a risk of explosion.
Check all fittings for gas tightness.

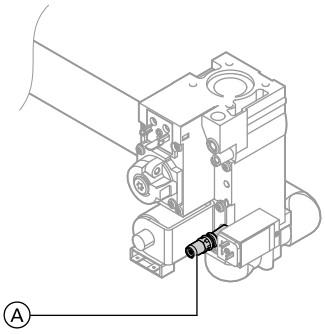
Please note
The use of leak detection spray can result in incorrect functions. Leak detection spray must not come into contact with electrical contacts.

Further details regarding the individual steps (cont.)

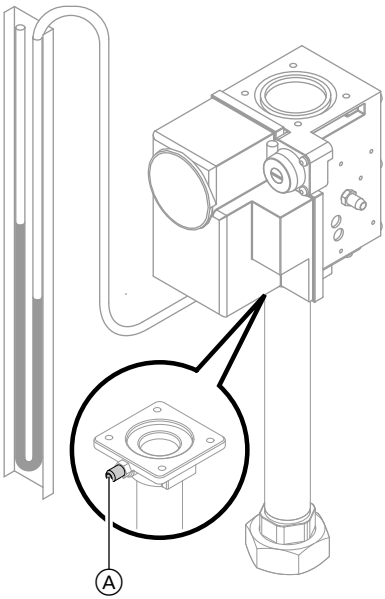
Checking the static and the supply pressure

Static pressure

87 kW



115 to 311 kW



1. Close the gas shut-off valve.
2. Undo the screw in test nipple Ⓐ, but do not remove.
3. Connect the pressure tester at test nipple Ⓐ.
4. Open the gas shut-off valve.
5. Check the static pressure (max. 60 mbar).
6. Record the actual value in the report (on page 61).

Further details regarding the individual steps (cont.)

Supply pressure

1. Start the burner.

   Note
   For commissioning, see page 7. Switch the burner to maximum heating output. For this, activate the emissions test switch at the control unit.

2. Check the supply pressure (flow pressure), see table on page 13.

   Note
   The supply pressure (flow pressure) should be between 20 and 50 mbar. The gas pressure switch is factory set to 10 mbar. Never alter this setting.

3. Record the actual value in the report (on page 61).

4. Close the gas shut-off valve.

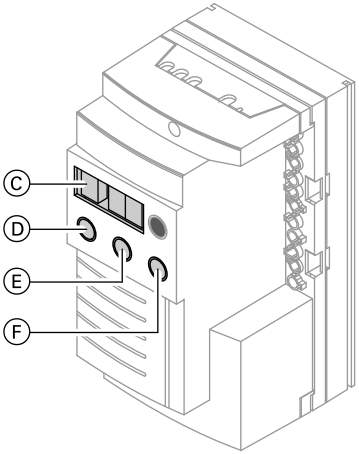
5. Remove the pressure tester and close test nipple Ⓐ.

Supply pressure (flow pressure)	Measure
Below 15 mbar	Make no adjustments and notify the gas supply utility.
15 to 20 mbar	Please note The boiler may only be operated temporarily with these settings (emergency mode). Notify your gas supply utility.
20 to 50 mbar	Start the boiler
Above 50 mbar	Install a separate gas pressure governor with zero off upstream in the boiler system, and regulate the pressure to 20 mbar. Notify your gas supply utility.

Further details regarding the individual steps (cont.)

Checking the CO_2 content

Preparing the test



1. Open the gas shut-off valve.
2. Start the burner.
3. Press "S" Ⓔ and "-" Ⓓ simultaneously.
   Display Ⓒ will then show the following:
   - Under Status: "d" (= control stop)
   - Under Service: Modulation level in % ("00." = 100 % = upper heating output, "00" = 0 % = lower heating output)

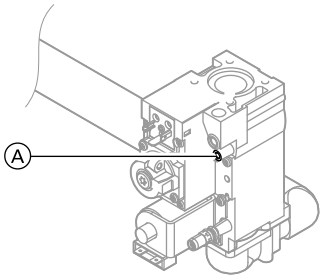
CO_2 test at the upper heating output (87 kW)

1. Press "+" Ⓕ until the service display has incremented to "00." (= 100 %).
2. Check the CO_2 content at the flue pipe.

Burner output in kW	Permissible CO_2 content in %
87	9.0 (±0.3)

Note
*The unconnected end of the hose is open in open flue operation. For **balanced** flue operation, it is pushed onto the inlet adaptor.*

Further details regarding the individual steps (cont.)

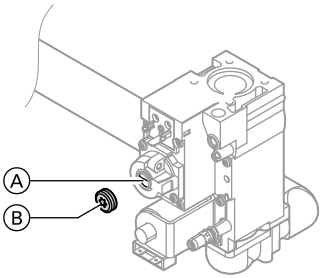


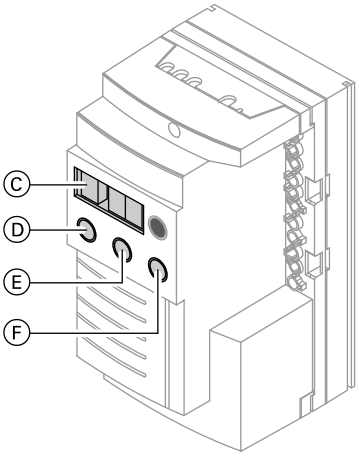
3. If the CO_2 content must be adjusted:
Turn adjusting screw Ⓐ in small increments until the CO_2 content reaches the specified range.
- Turning clockwise
  → CO_2 content **falls**
- Turning anti-clockwise
  → CO_2 content **rises**

Note
The adjusting screw has no end-stop. The starting position will be reached again after 4 turns.

4. Record the actual value in the report (on page 61).

CO_2 test at the lower heating output (87 kW)





1. Press "-" Ⓓ until the service display has decremented to "00" (lower heating output).

2. Check the CO_2 content at the flue pipe. For permissible CO_2 content, see the table on page 14.

Further details regarding the individual steps (cont.)

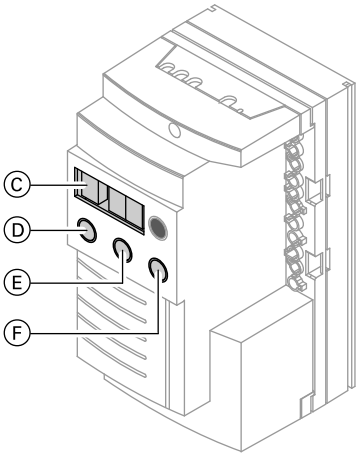
3. If the CO_2 content must be adjusted:
- Remove cover Ⓑ.
- Turn adjusting screw Ⓐ in small increments (Torx 40) until the CO_2 content falls within the specified range:
  – Turning clockwise
  → CO_2 content **rises**
  – Turning anti-clockwise
  → CO_2 content **falls**

4. Record the actual value in the report (on page 61).

Rechecking the values
Regulate to the upper and lower heating output using the programming unit in the burner control unit. If the values do not match the permissible CO_2 content according to the table on page 14, repeat the steps for the upper and lower heating output.

5. Press "S" Ⓔ and "-" Ⓓ simultaneously. The burner is now in operating mode.

CO_2 test at the upper heating output (115 kW to 311 kW)

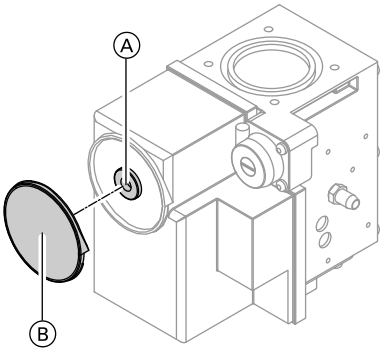


1. Press "+" Ⓕ until the service display has incremented to "00." (=100 %).

2. Check the CO_2 content at the flue pipe.

Burner output in kW	Permissible CO_2 content in %
115	9.0 (±0.3)
142	9.0 (±0.3)
186	9.0 (±0.3)
246	8.8 (±0.3)
311	8.8 (±0.3)

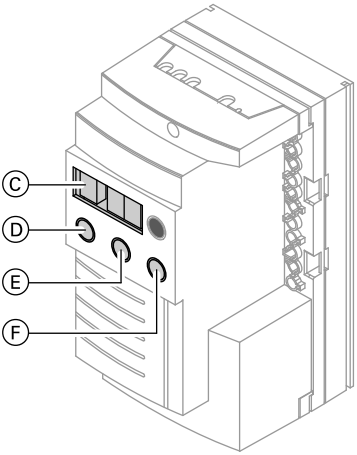
Further details regarding the individual steps (cont.)



3. If the CO_2 content must be adjusted:
   - Remove cap Ⓑ.
   - Turn setting screw Ⓐ in small increments (3 mm Allen key) until the CO_2 content lies within the specified range:
     – Turning clockwise
       → CO_2 content **falls**
     – Turning anti-clockwise
       → CO_2 content **rises**

4. Record the actual value in the report (on page 61).

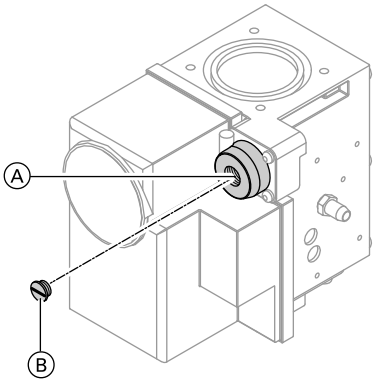
CO_2 test at the lower heating output (115 kW to 311 kW)



1. Press "-" Ⓓ until the service display has decremented to "00" (lower heating output).

2. Check the CO_2 content at the flue pipe. For permissible CO_2 content, see the table on page 16.

Further details regarding the individual steps (cont.)



3. If the CO_2 content must be adjusted:
- Remove cover Ⓑ.
- Turn adjusting screw Ⓐ in small increments (Torx 40) until the CO_2 content falls within the specified range:
  - Turning clockwise → CO_2 content **rises**
  - Turning anti-clockwise → CO_2 content **falls**

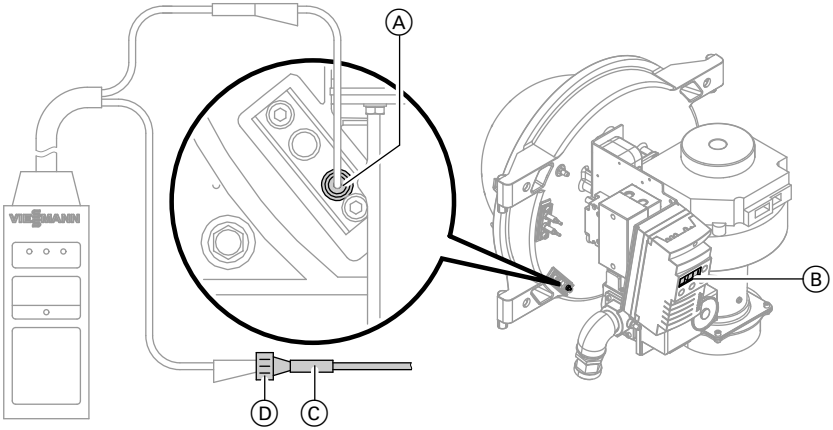
4. Record the actual value in the report (on page 61).

Rechecking the values
Regulate to the upper and lower heating output using the programming unit in the burner control unit. If the values do not match the permissible CO_2 content according to the table on page 16, repeat the steps for the upper and lower heating output.

5. Press "S" Ⓔ and "-" Ⓓ simultaneously. The burner is now in operating mode.

Further details regarding the individual steps (cont.)

Checking the ionisation current



1. Switch OFF the mains isolator.
2. Pull ionisation cable plug Ⓒ.
3. Switch ON the mains isolator. There must be a fault shutdown after the burner has tried to start. Display Ⓑ flashes fault code "F 25".
4. Switch OFF the mains isolator.

   Note
   Test cable no.1 is required when checking with the Testomatik-Gas. You can also carry out this test with a multimeter.

5. Join ionisation cable plug Ⓒ and adaptor Ⓓ.
6. Push test cable socket Ⓐ onto the ionisation electrode.
7. Switch the mains isolator ON and press reset.
8. Check the ionisation current.

   Note
   The ionisation current should be at least 3 µA for approx. 2 to 3 s after the gas valve has been opened and during operation.

9. Record the actual value in the report (on page 61).
10. Switch the mains isolator OFF, remove the test equipment and reconnect the ionisation cable connectors.
11. Switch ON the mains isolator.

Further details regarding the individual steps (cont.)

Shutting down the system

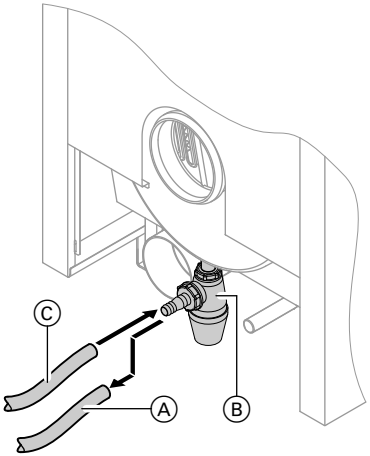
1. Switch OFF the mains isolator or the power supply and safeguard against unauthorised reconnection.
2. Pull plug-in connector 41 and 90 from the burner.
3. Close the gas shut-off valve.

Opening the boiler door

1. Remove the gas supply pipe.
2. Undo the four screws on the boiler door and open the door.

! **Please note**
Scratches inside the combustion chamber can lead to corrosion. Never put tools or other objects into the combustion chamber.

Separating the neutralising system (if installed) from the boiler and connecting the drain hose



1. Separate hose Ⓐ to the neutralising system from siphon Ⓑ.
2. Connect drain or cleaning hose Ⓒ to the siphon and run it to the drain.

Cleaning the combustion chamber and heating surfaces

Thoroughly clean the combustion chamber and heating surfaces with a water jet.

! **Please note**
Scratches on parts that are in contact with flue gas can lead to corrosion.

Further details regarding the individual steps (cont.)

Only use plastic brushes, not wire brushes or sharp objects.

For normal cleaning, flush the heating surfaces thoroughly with a water jet. You may use cleaning agents if you notice stubborn residues, surface discolouration or soot deposits.
For this, observe the following:

- Only use solvent-free cleaning agents. Ensure that no cleaning agent gets between the boiler body and the thermal insulation.
- Remove soot deposits with alkaline cleaning agents with additional surfactants (e.g. Fauch 600).
- Remove coatings and surface discolouration (yellow-brown) with slightly acidic, chloride-free cleaning agents based on phosphoric acid (e.g. Antox 75 E).
- Remove loose deposits from the boiler; flush the heating surfaces and the flue gas collector thoroughly with a water jet.

Cleaning agent manufacturer's details.

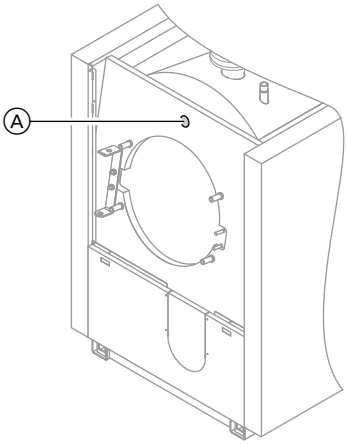
Note
"Fauch 600" and "Antox 75 E"
Manufacturer:
Hebro Chemie GmbH
Rostocker Strasse 40
D-41199 Mönchengladbach

Checking gaskets and thermal insulation parts

1. Check gaskets and the packing cord in the boiler door for damage.
2. Check the thermal insulation components of the boiler door for damage.
3. Replace any damaged parts.

Further details regarding the individual steps (cont.)

Checking all connections on the heating water side and the sensor well for leaks



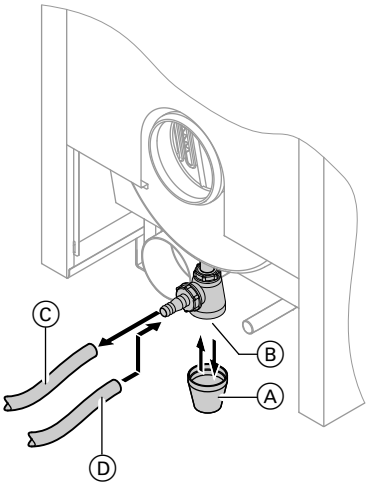
Ⓐ Sensor well

Note
Also check the connections to control equipment and to the minimum pressure switch (low water indicator) for leaks.

Cleaning and reconnecting the condensate drain system

Note
Clean the inside of the condensate drain system at least annually.

Further details regarding the individual steps (cont.)



1. Pull drain or cleaning hose Ⓒ off.
2. Clean the inside of the condensate drain system (hose, pipe).
3. Clean the neutralising system (if installed) in accordance with the manufacturer's instructions.

   Neutralising system operating instructions

   Note
   You can obtain the neutralising agent from Viessmann quoting part no. 9521 702.
4. Release and flush lower part Ⓐ of siphon Ⓑ.
5. Fill lower part Ⓐ of siphon Ⓑ with water and reassemble.
6. Refit hose Ⓓ of the neutralising system to the siphon.

Checking the condensate drain and the neutralising system (if installed)

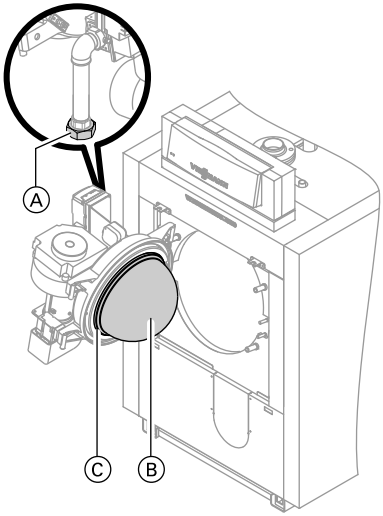
Add water to the combustion chamber.

Note
The water must flow from the condensate drain without back pressure.

If necessary, clean the condensate drain again.

Further details regarding the individual steps (cont.)

Checking the burner gauze assembly

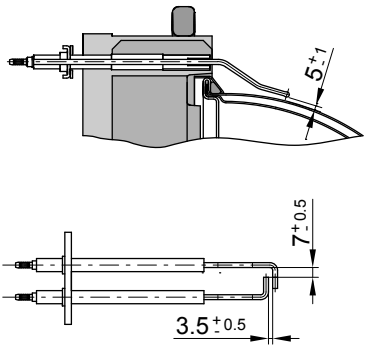


1. Undo fitting Ⓐ on the gas supply pipe.
2. Undo the screws on the boiler door and open the door.
3. Check the wire mesh of burner gauze assembly Ⓑ and thermal protection ring Ⓒ for damage. Slight wavy deformations of burner gauze assembly Ⓑ are OK.
4. Replace burner gauze assembly Ⓑ and thermal protection ring Ⓒ if required.

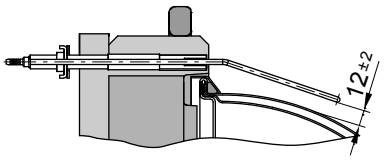
Installation instructions
Replacing burner components

Checking the ignition electrodes and ionisation electrode

Ignition electrodes



Ionisation electrode



Check the ignition electrodes and the ionisation electrode for correct gap towards the burner gauze assembly and damage (replace if required).

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Further details regarding the individual steps (cont.)

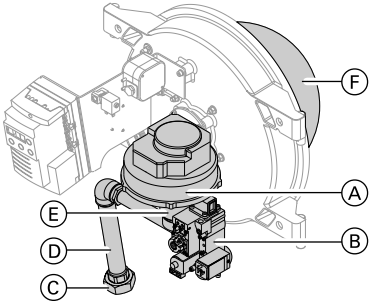
Closing the boiler door

Note
Tighten the boiler door screws evenly across with a torque of approx. 18 Nm.

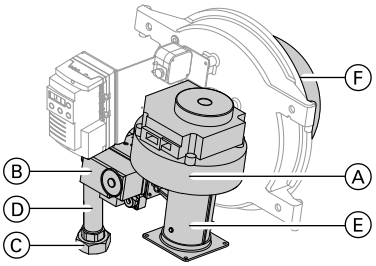
Information regarding the door lock
Before commissioning, check that the boiler door is seated correctly and has no leaks.
If required, correct the alignment of the boiler door by loosening (adjusting) the hinge bracket to ensure there are no leaks.

Cleaning the burner

87 kW



115 to 311 kW



1. Undo fitting Ⓒ on gas supply pipe Ⓓ.
2. Remove Venturi mixing pipe Ⓔ from fan Ⓐ.
3. Remove Venturi mixing pipe Ⓔ with gas train Ⓑ and gas supply pipe Ⓓ.

   Note
   For larger burners (246 to 311 kW), the rotary damper is also fitted with a drive at position Ⓔ.

4. Pull the connecting cables "100" and "100a" from fan Ⓐ and remove fan Ⓐ.

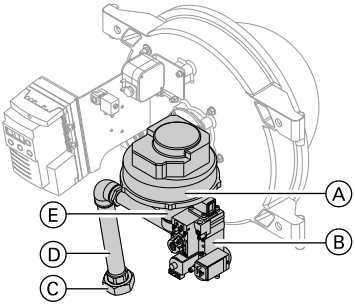
   Note
   Ensure that the gasket between the fan housing and the boiler door is correctly positioned.

5. Clean the fan housing and impeller with compressed air.
6. If required, vacuum the inside of burner gauze assembly Ⓕ.

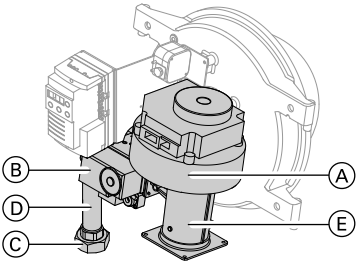
Further details regarding the individual steps (cont.)

Fitting the burner

87 kW



115 to 311 kW



1. Install fan Ⓐ.

Note
Ensure the gasket between the fan housing and the boiler door is correctly positioned.

2. Push the connecting cables "100" and "100a" onto the fan.

3. Secure Venturi mixing pipe Ⓔ with gas train Ⓑ and gas supply pipe Ⓓ to fan Ⓐ.

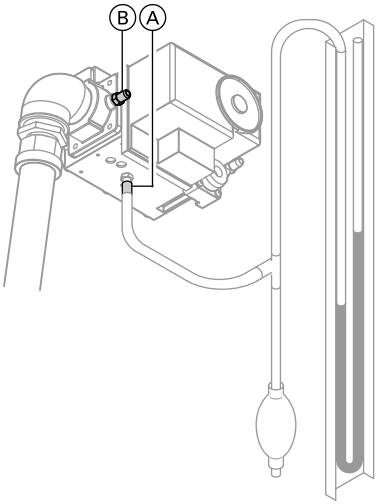
Note
For larger burners (246 to 311 kW), the rotary damper is also fitted with a drive at position Ⓔ.

4. Tighten fitting Ⓒ on gas supply pipe Ⓓ.

⚠ **Danger**
Escaping gas leads to a risk of explosion.
Check the fitting and gasket between the fan housing and the boiler door for gas tightness.

Further details regarding the individual steps (cont.)

Checking both gas train valves for tightness (for 115 to 311 kW)



1. Close the gas shut-off valve.
2. Undo the screw in test nipple Ⓑ, but do not remove.
3. Undo the screw in test nipple Ⓐ, but do not remove.
4. Connect the pressure tester with the manual pump at test nipple Ⓐ.
5. Gently activate the manual pump to build a test pressure of approx. 50 mbar.
6. Wait approx. 5 min for the temperature to level out and then observe the display on the pressure tester:
   The gas train is tight if the displayed pressure does not drop by more than 1 mbar within 5 min.
   Otherwise it leaks. In that case, return the gas train to your local Viessmann sales office for tests.
7. After the test, close both test nipples by tightening the respective screws.

Danger
Escaping gas leads to a risk of explosion.
Check the test nipple for gas tightness.

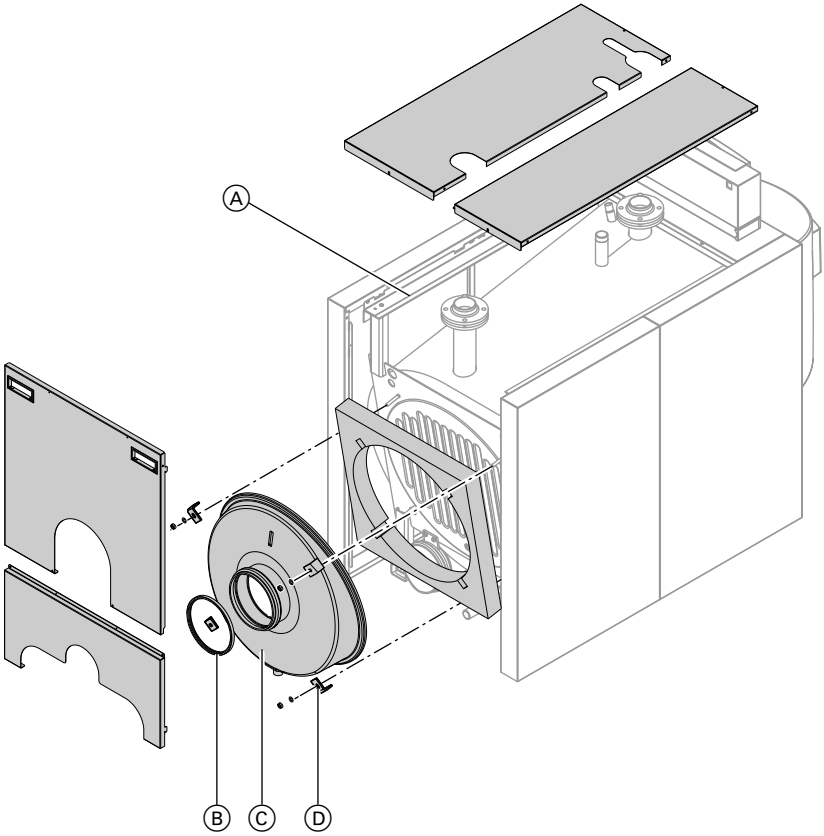
Checking all gas connections for tightness

Danger
Escaping gas leads to a risk of explosion.
Always carry out the following steps.

1. Insert new gaskets in all gas fittings that have been opened and tighten those fittings afterwards.
2. Open the gas shut-off valve.
3. Check the inlet seals of the gas train for tightness.
4. Start the burner (see page 7).
5. Check the outlet seals of the gas train and fittings between the fan and the boiler door and between the fan and the Venturi pipe for tightness.

Further details regarding the individual steps (cont.)

Checking the gaskets/seals on the flue gas side



1. Check flue gas collector Ⓒ and boiler body Ⓐ for tightness.

2. Check the lip seal Ⓑ of the boiler flue connection for tightness.

Note
The seals/gaskets can also be checked under full load with an inspection mirror. If required, remove the thermal insulation components. Traces of condensate on the outside of flue gas collector Ⓒ also point towards a leak.

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Further details regarding the individual steps (cont.)

3. If required, retighten the flue gas collector at clamping clips Ⓓ. Replace lip seal Ⓑ if it leaks.

Implementing final tests

1. Carry out the final tests according to the notes on page 14 to 19 .

2. Record the actual values in the report (on page 61).

Checking the water quality

Enter the amount of top-up water, the water hardness and the pH value in the tables.
For water quality requirements, see page 62.

Fill water m^3	Top-up water m^3	Meter reading m^3	Total water volume m^3	Date
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Max. fill volume: .....m^3

Further details regarding the individual steps (cont.)

Total hardness		pH value	Water treatment		Date
Feedwater	Boiler water	Boiler water	Medium	Metering volume	

The pH value should be between 8.2 and 9.5.

Checking the diaphragm expansion vessel and system pressure

Note
Observe the details provided by the manufacturer of the diaphragm expansion vessel.
Carry out this test on a cold system.

1. Drain the system until the pressure gauge indicates "0" or close the cap valve on the diaphragm expansion vessel and reduce the pressure in this vessel.
2. If the pre-charge pressure of the diaphragm expansion vessel is lower than the static system pressure, top up with nitrogen until the pre-charge pressure is 0.1 to 0.2 bar higher.
3. Top up with water until the charge pressure of the cooled system is 0.1 to 0.2 bar higher than the pre-charge pressure of the diaphragm expansion vessel.
   Permiss. operating pressure: 4 bar

Further details regarding the individual steps (cont.)

Checking the mixer for ease of operation and leaks

1. Remove the motorised lever from the mixer handle.
2. Check the mixer for ease of operation.
3. Check the mixer for leaks. Replace the O-ring gaskets if the mixer is leaking.
4. Snap the motorised lever into place.

Instructing the system user

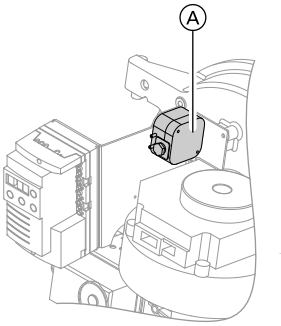
The installer should instruct the user in the operation of the system.

Operating and service documents

1. Complete and detach the customer registration card:
   - Hand system users their section for safekeeping.
   - Retain the heating contractor's section.
2. File all parts lists, operating and service instructions in the folder and hand this over to the system user.

Air pressure switch

Function



The air pressure switch Ⓐ signal will be interpreted under the following operating conditions:

- prior to the fan start (idle state check)
- in the pre-purge phase
- in control mode, subject to at least a starting output being produced. Any output lower than the starting output is not monitored.

Fault shutdown

The air pressure switch triggers a fault shutdown of the burner control unit (see page 33) under the following circumstances:

- if the idle state check is not successful after 5 attempts (anti-cycling function) (i.e the air pressure switch contact does not open within 30 s)
- if, during the pre-purge phase, the minimum flow rate is not produced (fault shutdown via the anti-cycling function)
- if, during the control mode, the air pressure switch fails or the air pressure lies outside the permissible range

The fault shutdown is indicated with fault display "L" on the burner control unit (see page 33 and 38) and **cannot** be rectified by pressing the reset button.
The fault shutdown can only be rectified by shutting down the burner control unit by switching off the **ON/OFF switch at the control unit**.

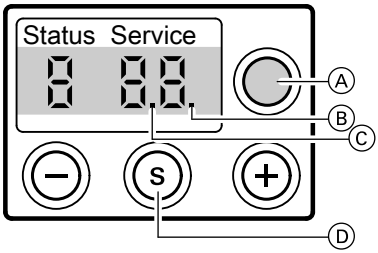
A restart will be initiated 5 times every 2 hours before the burner control unit is set to fault ("L") through a signal from the air pressure switch. The burner control unit will be set to fault ("L") if these attempts are unsuccessful. This indicates a serious fault. The fault shutdown through the air pressure switch ("L") will not be displayed as a fault by the **control unit**, as it is (like a shortage of gas "A") classified by the control unit as a maintenance matter.
At 87 kW, the air pressure switch is always set to 0.8 mbar (minimum) and at 115 to 311 kW to 1.0 mbar.
This guarantees clean combustion. This will also ensure a minimum pre-purge, as the air pressure switch still responds at minimum output.

Burner control unit

Display and programming unit

Function

A display and programming unit is integrated into the burner control unit. The display indicates the relevant operating conditions, the service and parameter conditions as well as all fault and error messages.

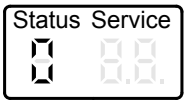


The display comprises three elements of seven segments each. Four keys enable adjustments to be made at the different operating levels.
A DIP switch at the back of the display and programming unit enables burner parameters to be configured (for settings, see page 36).

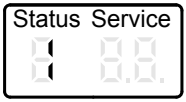
Ⓐ Reset button
Ⓑ Decimal point (will be shown if a display value exceeds 99)
Ⓒ Memory LED (will be displayed if a value is saved)
Ⓓ Selection key

Operating display

In standard mode, the display shows the current operating conditions. The same applies after pressing reset following a fault display.
The following displays are scrolled through automatically. In the case of faults, see the message codes on page 40.

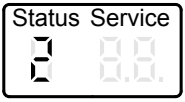


Standby

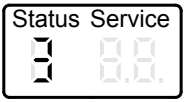


Start
Heat demand
System tests

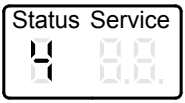
Burner control unit (cont.)



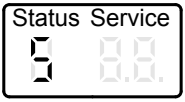
Idle state check
Fan ramp-up



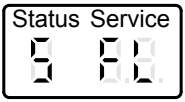
Pre-purge



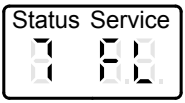
Pre-ignition



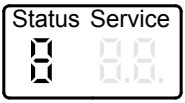
Safety time



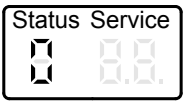
Flame established



Operation with flame



Post-purge



Standby

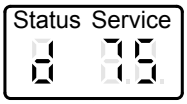
Burner control unit (cont.)

Display	Status (single digit)	Service (two digits)	See
Operating display in standard mode	Current operating condition, see page 33 and 34	Display "FL" if a flame signal is present	Page 34
Operating display for operation deviating from the standard condition	Message code "A" or "L", see the table on page 40	—	—
Service display	Message code "d", see page 35	Current level of modulation	Page 35
Fault display	For message code "F", see the table on page 40, display flashes	Fault code display flashes, see page 40	Page 40

Manual mode and service display

A heat demand must be issued by the control unit to call up the service display and for manual mode. The service display shows the current modulation level in %.

Display:
"d 00" Lower heating output
"d 00." Upper heating output (with the full stop behind the last digit)

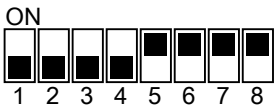
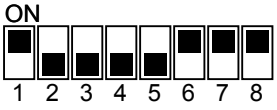
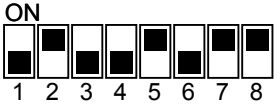
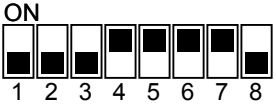
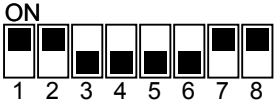


1. Press ⊖ and Ⓢ simultaneously; the burner enters manual mode. The display shows "d" under Status.
2. Adjust the lower heating output: Press ⊖ until the display shows "d 00".
3. Adjust the upper heating output: Press ⊕ until the display shows "d 00.".
4. Press ⊖ and Ⓢ simultaneously; the burner returns to modulating mode.

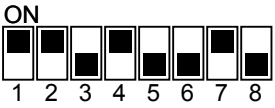
DIP switch setting or parameter set

The DIP switch (at the back of the display and programming unit) is factory-set to the rated heating output of the burner. A change to this factory setting is only required for operation with reduced heating output.

Note
If another parameter set is selected, this must be acknowledged (see page 37).

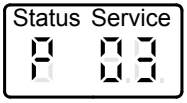
Setting **Rated burner heating output**	**Setting** **Reduced burner heating output**
Parameter set 0 ≙ 87 kW 	Parameter set 6 Not possible
Parameter set 1 ≙ 115 kW 	Parameter set 7 Not possible
Parameter set 2 ≙ 142 kW 	Parameter set 8 ≙ 100 kW 
Parameter set 3 ≙ 186 kW 	Parameter set 9 ≙ 130 kW

Burner control unit (cont.)

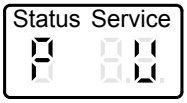
Setting Rated burner heating output	Setting Reduced burner heating output
Parameter set 4 ≙ 246 kW 	Parameter set 10 ≙ 173 kW
Parameter set 5 ≙ 311 kW 	Parameter set 11 ≙ 218 kW 

Acknowledging a parameter set

A flashing "P" is shown under "Status" if a parameter set is changed via the DIP switch or if the burner control unit has been replaced. The numbers shown under Service indicate the selected parameter set (see page 36).



"U" will appear under "Service" if an invalid DIP switch setting is selected.



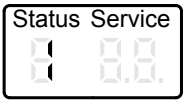
1. Check the DIP switch setting; if required, change it in accordance with page 36 .
2. Press ⊖ and ⊕ simultaneously for approx. 2 s.
   The selected parameter setting has been accepted when "P" no longer flashes and the memory LED illuminates.

3. Press the reset button.

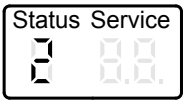
The operating display will then be shown again.

Displaying the selected parameter set

This display will be terminated if no key is pressed within 20 s.



1. Simultaneously press keys Ⓢ and ⊕.

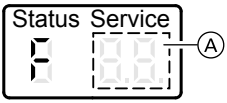


2. Press Ⓢ.
The selected parameter set is displayed under "Service".

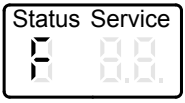
3. Simultaneously press keys Ⓢ and ⊕.
The operating display will then be shown again.

Fault display

The fault display will be activated automatically if the burner control unit switches to a fault state. The most recent fault will then be displayed under "Service". The illuminated segments of the display will flash.



Ⓐ Fault code of the most recent fault



1. Press ⊕.
The operating phase under which the fault has occurred, is displayed under "Service" as long as this key is held down. (Value from "01" to "21"; see flow diagram on page 47).

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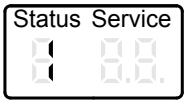
2. Press ⊖.
   The additional fault information will be displayed under "Service" for as long as this key is held down.

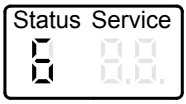
3. Press the reset button.
   The operating display will then be shown again.

Fault memory

The most recent six faults are saved and may be called up. The order of scans ranges from the most recent to the earlier fault codes. The fault memory display will be terminated if no key is pressed within 20 s.



1. Press the reset button and ⊕ simultaneously.
   The most recent fault will be displayed:
   "1" is displayed under "Status".
   The fault code is displayed under "Service".



2. Press Ⓢ to scan the penultimate to the sixth from last fault.

Display under "Status"	Fault
1	most recent fault
.	.
.	.
.	.
6	sixth from last fault

   The relevant fault code is displayed under "Service".

3. Press Ⓢ.
   The operating display will then be shown again.

Diagnosis

Faults with fault indicator on the display and programming unit

Message codes

Message code	System characteristics	Cause	Measures
A	Burner off	Gas pressure switch fault	Check the gas pressure switch
A	Burner off	Lack of gas	Notify your gas supply utility
F	Burner is in a fault state	See fault code	See fault code steps
L	Air pressure switch switches off during operation	Flue gas back pressure, condensate banked up	Check condensate drain, remove flue gas back pressure, reset the burner control unit in accordance with the details on page 32 .
P	System off	Incorrect parameter set selected	See acknowledging a parameter set, page 37.

General process errors

Fault code	System characteristics	Cause	Measures
20	Fan pressure is produced during the air pressure switch idle state check	Wind influence on fan	Check the flue draught (chimney)
20	Air pressure switch contact is not in the idle state	Air pressure switch faulty	Replace the air pressure switch
21	Air pressure switch shows no air pressure, fan not running	Air pressure switch faulty	Replace the air pressure switch
21	Fan does not run	Fan faulty; cables are faulty or broken	Check cables and replace the fan if required
22	The gas pressure switch signals no gas pressure during the safety time	Gas shut-off valve closed, gas pressure switch faulty	Open the gas shut-off valve and check the gas flow pressure; clean the gas filter if required

Diagnosis (cont.)

Fault code	System characteristics	Cause	Measures
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Ionisation electrode incorrectly adjusted	Adjust ionisation electrode (see page 24).
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Ignition electrodes incorrectly adjusted	Adjust ignition electrodes (see page 24).
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Insulation body of ignition electrodes cracked	Replace the ignition electrodes
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Incorrect gas type selected	Adjust gas type (see page 9).
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Gas train does not open	Check the gas train and replace if required
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Combustion characteristics not ideal	Adjust burner (see from page 14).
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	Incorrect parameter set selected	Adjust the parameter set (see page 36 to 37).
25	No flame signal after the safety time; the ionisation flame monitor reports no flame signal	285 kW burner for open flue operation	Adjust burner settings (see page 46).

Diagnosis (cont.)

Fault code	System characteristics	Cause	Measures
26	Ionisation flame monitor reports external light ingress during the start or after the post-purge	Ignition cables shorted out	Remove the short circuit.
26	Ionisation flame monitor reports external light ingress during the start or after the post-purge	Ionisation cable or electrode short circuit	Remove the short circuit.
26	Ionisation flame monitor reports external light ingress during the start or after the post-purge	Gas train leaks	Replace gas train.
26	Ionisation flame monitor reports external light ingress during the start or after the post-purge	Incorrect parameter set selected	Adjust the parameter set (see page 36 to 37).
27	Flame tears off during operation	Incorrect gas type selected	Adjust gas type (see page 9).
27	Flame tears off during operation	Burner gauze assembly faulty	Replace the burner gauze assembly.
27	Flame tears off during operation	Incorrect parameter set selected	Adjust the parameter set (see page 36).
27	Flame tears off during operation	Combustion characteristics not ideal	Adjust burner (see from page 14).
27	Flame tears off during operation	285 kW burner for open flue operation	Adjust burner settings (see page 46).
29	Burner control unit fault	Internal fault of the gas pressure switch input	Replace burner control unit.
2A	Burner control unit fault	Internal fault of the air pressure switch input	Replace burner control unit.
2b	Burner control unit fault	Internal flame monitor fault	Replace burner control unit.

Diagnosis (cont.)

Fault code	System characteristics	Cause	Measures
2C	Burner control unit fault	Fault during test of safety inputs	Replace burner control unit.
2d	Burner control unit fault	Internal fault, low voltage recognised	Replace burner control unit.
2E	Burner control unit fault	Internal fault, voltage failure recognised	Replace burner control unit.
2F	Burner control unit fault	Internal heat demand fault	Replace burner control unit.
2H	Burner control unit fault	Lead break, strapping plug [47], safety chain	Check strapping plug [47].
31	Burner control unit fault	Error in feedback from gas safety valves, output relay does not respond	Replace burner control unit.
32	Burner control unit fault	Error in feedback from choke valve, output relay does not respond	Replace burner control unit.
35	Burner control unit fault	Error in feedback from ignition, output relay does not respond	Replace burner control unit.
36	Fan speed during start-up or during operation is outside the set range for longer than 5 s; the speed for ignition setting or start-up output in operation is not reached	The fan is faulty; cable "100a" is faulty or broken	Check the cable and replace cable "100a" or the fan if required.

Diagnosis (cont.)

Fault code	System characteristics	Cause	Measures
37	The fan does not reach its set speed	The fan is faulty; cable "100" or "100a" is faulty or broken; the fan is blocked by a foreign body	Check cable "100" or "100a"; if required, replace the cable or fan or remove foreign bodies.
42	Burner control unit remains in start-up position, no start in spite of heat demand	Safety chain interrupted	Check jumper B2 (plug 47) of safety chain at burner control unit.
4E	Burner control unit fault	Internal fault	Replace burner control unit.
Scrolling display: 1 - 2 - 3 - 4 - 5 - 7	Constant start attempt	Cores "L1" and "N" at the power supply terminals of the control unit interchanged	Check the power supply and swap the cores

Internal system fault

Internal system faults are created if a perfect program sequence can no longer be guaranteed.

Fault code	System characteristics	Cause	Measures
01 and 02, 04 to 15, 70 to 79, 7A, FF	Fault in the burner control unit area	Internal system fault	Replace burner control unit.
FF	Fault in the burner control unit area	EEPROM	Have your system tested for EMC interference.

Diagnosis (cont.)

Faults without fault display

Fault	Cause	Measure
Combustion fault through pulsation	Excessive gas throughput	Adjust gas throughput in accordance with rated boiler heating output.
	Too little or too much air	Adjust gas throughput in accordance with rated boiler heating output.
	Condensate banked up in flue system	Check condensate drain.
	Incorrect flue outlet	Check flue outlet.
Burner restarts and switches off after the safety time has expired	Cores "L1" and "N" at the power supply terminals of the control unit interchanged	Check the power supply and swap the cores.
CO is formed or burner is very sooty	Too little or too much air	Adjust correctly. Check ventilation of installation room.
	Insufficient draught in flue system	Check flue system.
CO_2 content too low	Incorrect setting	Check that burner has been adjusted for the correct gas type, and change gas restrictor if required (see from page 9). Adjust burner in accordance with the details from page 14 .
Excessive flue gas temperature	Excessive gas throughput	Adjust gas throughput in accordance with rated boiler heating output (see supply values, page 66). Check condition of secondary heating surfaces of the boiler, and clean if required.
Whining noises	Incorrect CO_2 settings	Adjust burner in accordance with the details from page 14 .

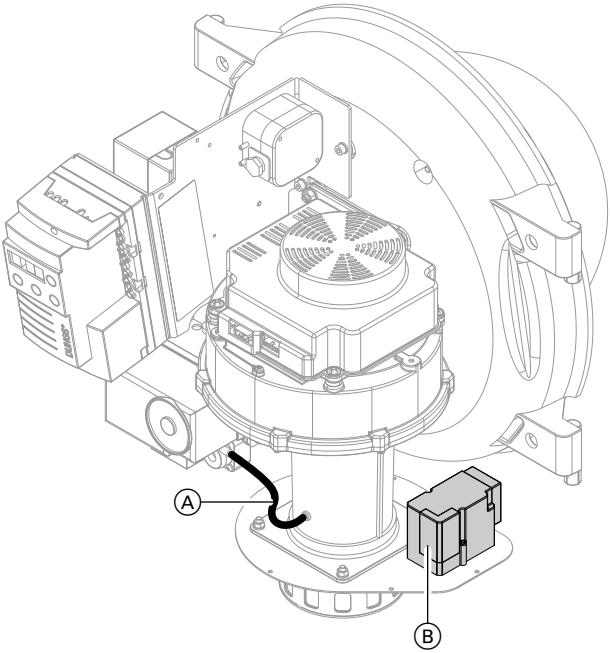
Start-up problems with 285 kW, open flue operation

Application information

Applies only to the MatriX radiant burner, type VMA III with 285 kW, for **open flue operation**.

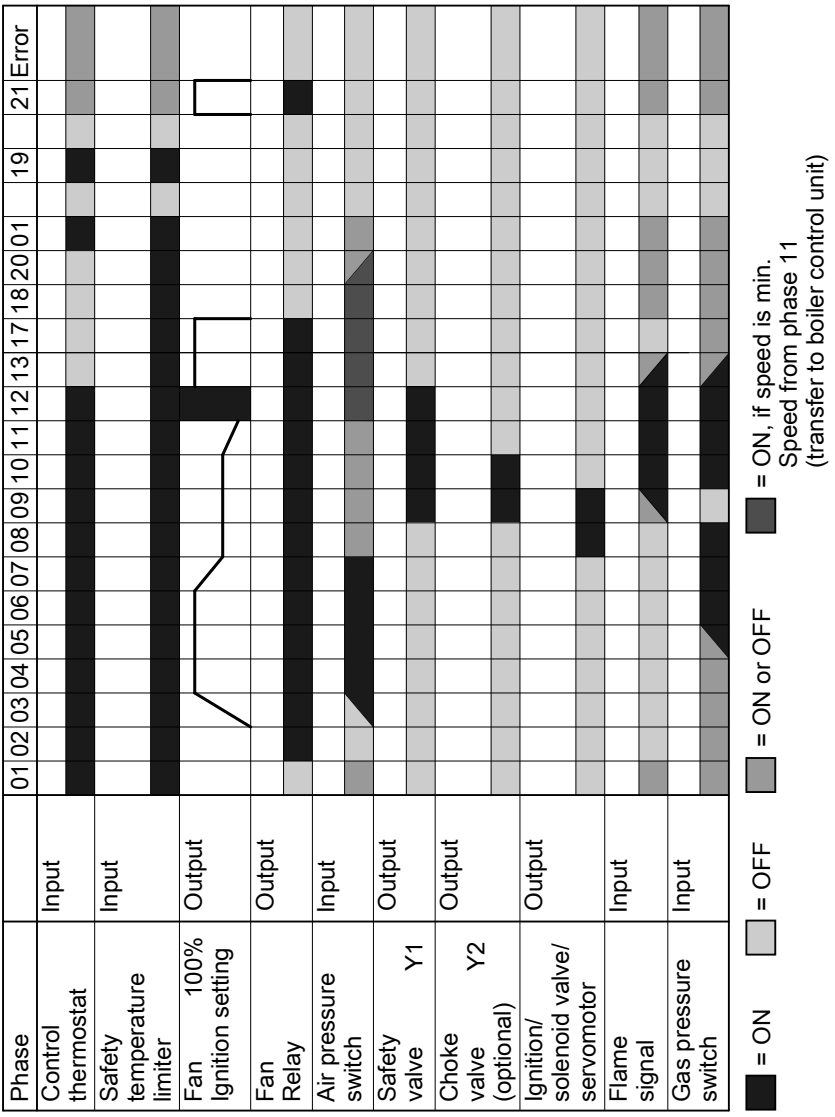
If the following problems are experienced with the burner:
- Loud and irregular start-up characteristics.
- Frequent fault shutdowns with fault message F25 or F27.

Modifying the burner settings



1. Pull compensation line Ⓐ.
2. Set servomotor control cam Ⓑ stage 2 to 35°.
3. Start the burner and set the CO_2 to 8.8 %.

Burner control unit flow chart



Burner control unit flow chart (cont.)

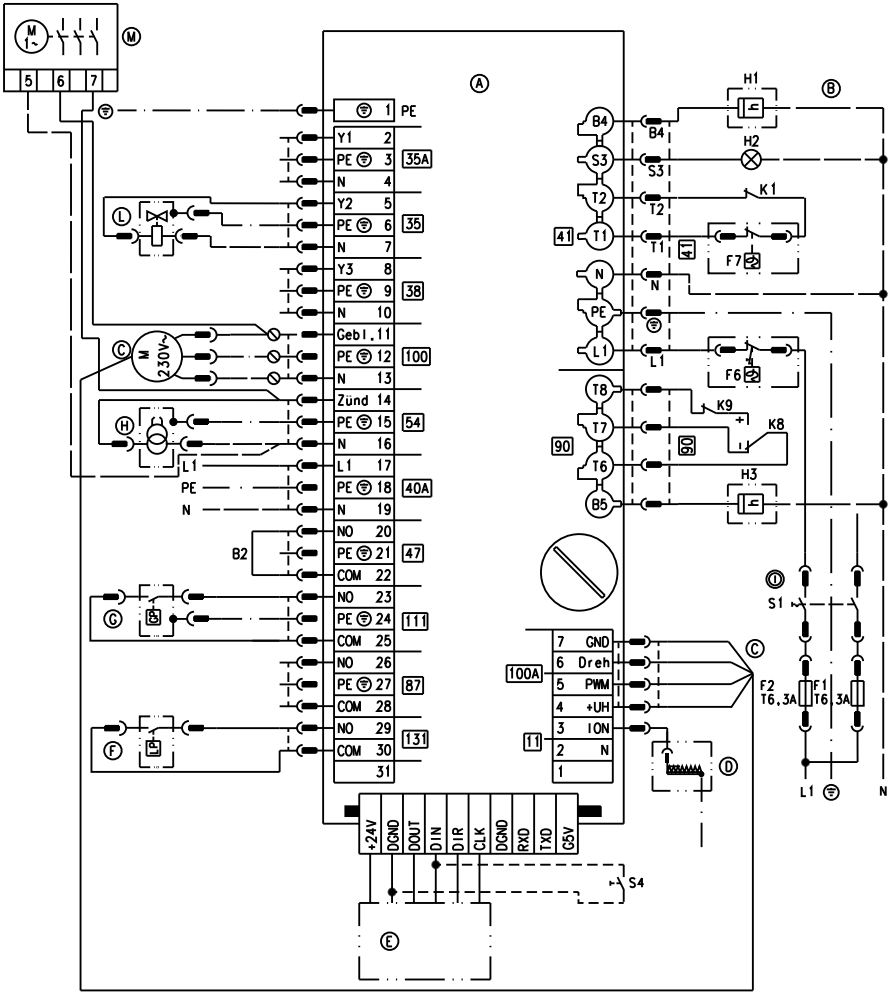
After the controller issues a heat demand, the following program sequence will be run:

Phase		Duration
01	Test for heat demand	1 s
02	Checking the idle state of the air pressure switch and the fan	1 to 30 s
03	Fan ramps up to speed (a fault shutdown will be initiated if the air pressure switch does not report within this time that the air pressure has reached a defined range, or if the fan does not reach its set speed)	1 to 30 s
04	Pre-purge I	5 s
05	Pre-purge II	1 s
06	Pre-purge III	30 s
07	Ignition setting (the burner control unit will enter a fault state if the fan does not achieve its set speed)	1 to 30 s
08	Pre-ignition	2 s
09	Safety time, start (safety time A) (enabling the safety valves at the start of safety time A, safety time, operation < 1 s); (no gas pressure switch monitoring)	2 to 10 s
10	Stabilising the flame in the ignition position	20 to 60 s
11	Changing to the control mode (ramps to the set speed selected at the control unit)	1 to 30 s
12	Operation (the system will be restarted after expiry of this time)	max. 23:59 h
13	Burner run-on time	max. 30 s
17	Post-purge	1 to 60 s
18	Restart blocking time	0 s
19	Gas shortage position	max. 30 min
20	Standby (a restart follows a heat demand and the system restarts after expiry of this time)	max. 23:59 h

In the case of fault shutdown from phase 09:

21	Fan run-on before lockout	5 s

Burner control unit connection diagram



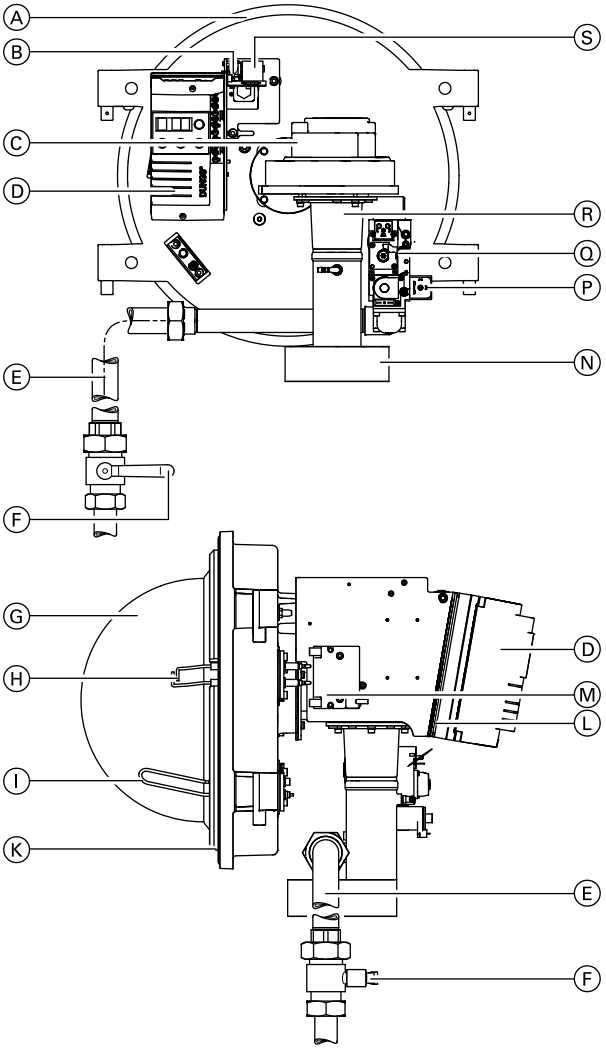
- Ⓐ Burner control unit MPA 51
- Ⓑ Vitotronic control unit
- Ⓒ Fan motor with PWM control and feedback
- Ⓓ Flame monitoring via an ionisation current
- Ⓔ Display unit with reset function
- Ⓕ Air pressure switch
- Ⓖ Minimum pressure, gas pressure switch
- Ⓗ Ignition unit
- Ⓚ Gas fuel safety valve
- Ⓛ Choke valve (for 87, 142 and 186 kW)
- Ⓜ Servomotor for rotary valve damper (for 246 and 311 kW)

Burner control unit connection diagram (cont.)

B2 Safety chain jumper
F1 Backup fuse
F2 Backup fuse
F6 High limit safety cut-out
F7 Temperature controller
H1 Hours run meter, total
H2 Fault message
H3 Hours run meter
Modulation; lower rated heating output; upper rated heating output
K1 Relay contact
S1 ON/OFF switch (inside the control unit)
S3 Output controller (inside the control unit)

Component overview

Pressure-jet gas burner, type VMA III, 87 kW



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Ⓐ Boiler door
Ⓑ Air pressure switch
Ⓒ Fan
Ⓓ Display and programming unit

Component overview (cont.)

Ⓔ Gas supply pipe
Ⓕ Gas shut-off valve
Ⓖ Burner gauze assembly
Ⓗ Ignition electrodes
Ⓘ Ionisation electrode
Ⓚ Thermal insulation block
Ⓛ Burner control unit
Ⓜ Ignition unit
Ⓝ Inlet adaptor for balanced flue operation (option)
Ⓟ Gas pressure switch
Ⓠ Gas train
Ⓡ Venturi mixing pipe
Ⓢ Choke valve

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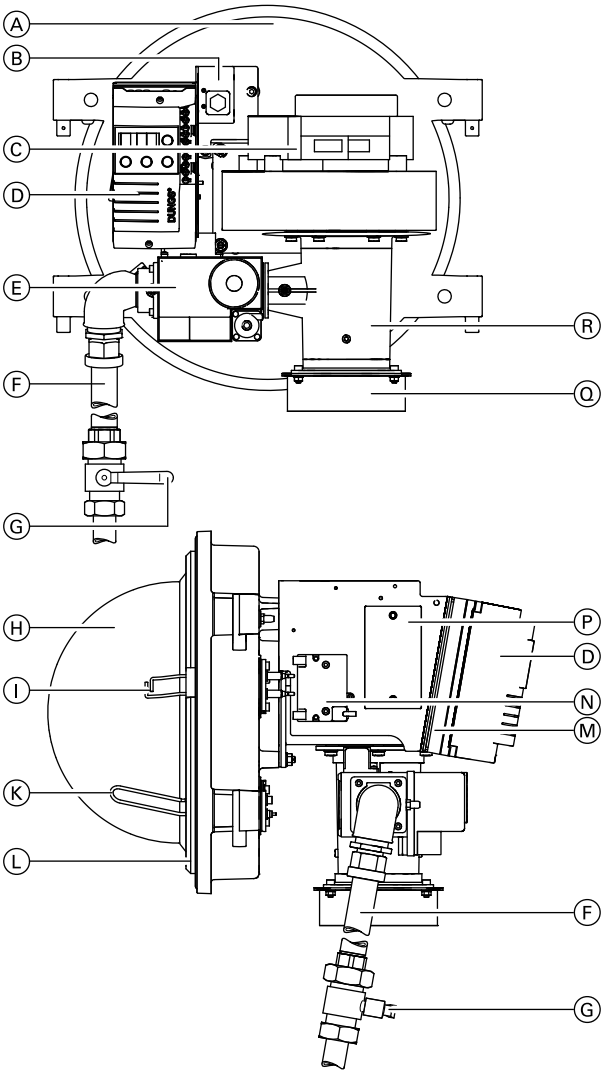
Component overview (cont.)

Pressure-jet gas burner, type VMA III, 115 to 311 kW



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Ⓐ Boiler door
Ⓑ Air pressure switch
Ⓒ Fan
Ⓓ Display and programming unit

Component overview (cont.)

Ⓔ Gas train
Ⓕ Gas supply pipe
Ⓖ Gas shut-off valve
Ⓗ Burner gauze assembly
Ⓘ Ignition electrodes
Ⓚ Ionisation electrode
Ⓛ Thermal insulation block

Not shown: Choke valve for 142 and 186 kW and rotary valve damper for 246 and 311 kW.

Ⓜ Burner control unit
Ⓝ Ignition unit
Ⓟ Suppressor choke box
Ⓠ Inlet adaptor for balanced flue operation (for 115, 142 and 186 kW)
Ⓡ Venturi mixing pipe

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Adjusting codes at the control unit

Vitotronic service instructions

In conjunction with the following control units:
- Vitotronic 100, type GC1B
- Vitotronic 200, type GW1B
- Vitotronic 300, type GW2B

Coding address	Rated heating output of the MatriX radiant burner in kW						Coding card
	87	115	142	186	246	311	
02	2	2	2	2	2	2	1041
05	0	0	0	0	0	0	
08	80	5	30	70	25	85	
09	0	1	1	1	2	2	
15	20	20	20	20	20	20	
0A	33	33	33	25	33	33	

Parts lists

When ordering spare parts:
Quote the part no. and serial no. (see type plate) and the position number of the required part (as per this parts list). Standard parts are available from your local supplier.

001 Flue gas collector
003 Siphon
004 Hinge bracket
101 Boiler door
102 Boiler door thermal insulation parts
104 Fixing parts
105 Burner gauze assembly
106 Graphite gasket
108 Ignition unit
109 Ignition cable
112 Ionisation cable
113 Burner control unit
114 Display and programming unit for burner control unit
115 Cable entry for burner control unit
116 Cable harness (servomotor, fan and ignition transformer) for 246 and 311 kW
Ignition unit connecting cable for 87, 115, 142 and 186 kW
117 Gas fan connecting cable
118 Gas train connecting cables
119 Air pressure switch with connecting cable
120 2/2-way solenoid valve (only for 87, 142 and 186 kW)
121 Servomotor (only for 246 and 311 kW)
122 Gas fan
123 Suppressor choke box (not for 87 kW)
124 Rotary valve damper (only for 246 and 311 kW)
125 Articulated rod (only for 246 and 311 kW)
126 Venturi mixing pipe
127 E gas restrictor
128 Gas train with gas pressure switch
130 Burner hood
131 Hood fixing pack
140 Fan sealing plate
200 Front panel, top
201 Front panel, bottom
202 Back panel, top
203 Back panel, bottom
204 Side panel r.h. front and l.h. back
205 Side panel l.h. front and r.h. back
206 Top panel, right
207 Top panel, left
208 Control unit fascia
209 Thermal insulation jacket
210 Thermal insulation mat, back
211 Thermal insulation mat, front
212 R.h. and l.h. cover panel
213 Vitocrossal 200 logo
214 Edge protector
215 Top fixing rail
216 Bottom fixing rail

Wearing parts
107 Ignition electrode block
110 Ionisation electrode
111 Electrode block gasket

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Parts lists (cont.)

Parts not shown

103 Small parts comprising:
- a Threaded connector
- b Cheese head screw M6 x 10
- c Washer 6.4 mm
- d Hexagon screw M5 x 16
- e Washer 5.3 mm
- f Oval head screw A M4 x 45
- g Screw EJOT-PT KBL 40
- h Countersunk screw M8 x 16
- i Cheese head screw M4 x 20
- j Hose 6 x 1.5 320 mm
- k Threaded elbow fitting
- l Compensation line connection
- m Cheese head screw A M3 x 10
- n Washer 3.2 mm
- o Cheese head screw M5 x 40
- p Washer 4.3 mm
- q Stud M8 x 20
- r Hexagon screw M8 x 16
- s Washer 8.4 mm
- t Cheese head screw Z4 M4 x 12
- u Cheese head screw M5 x 12
- v Hexagon screw M5 x 16
- w Washer 5.3 mm

132 Set of additional parts for balanced flue operation

133 Enriching nozzle

134 Compensation set (only for 115 and 246 kW)

300 Thermal insulation pack

301 Spray paint, Vitosilver

302 Touch-up paint stick, Vitosilver

303 Installation instructions

304 Service instructions

Ⓐ MatriX burner type plate

Ⓑ Label "Set to ..."

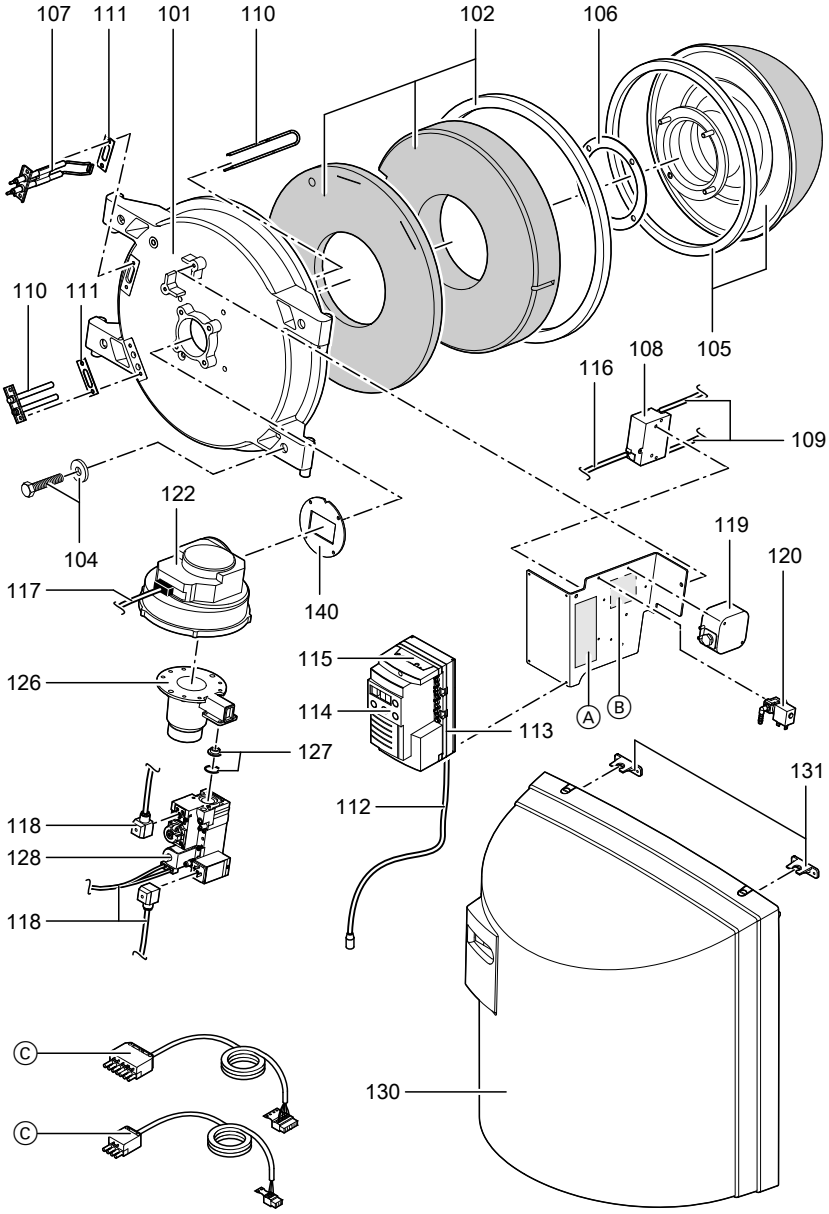
Ⓒ Burner cable (see parts list in the service instructions of the boiler control unit)

Ⓓ Boiler control unit (see parts list in the service instructions of the boiler control unit)

Ⓔ Type plate, either on the l.h. or r.h. side

Parts lists (cont.)

MatriX burner 87 kW



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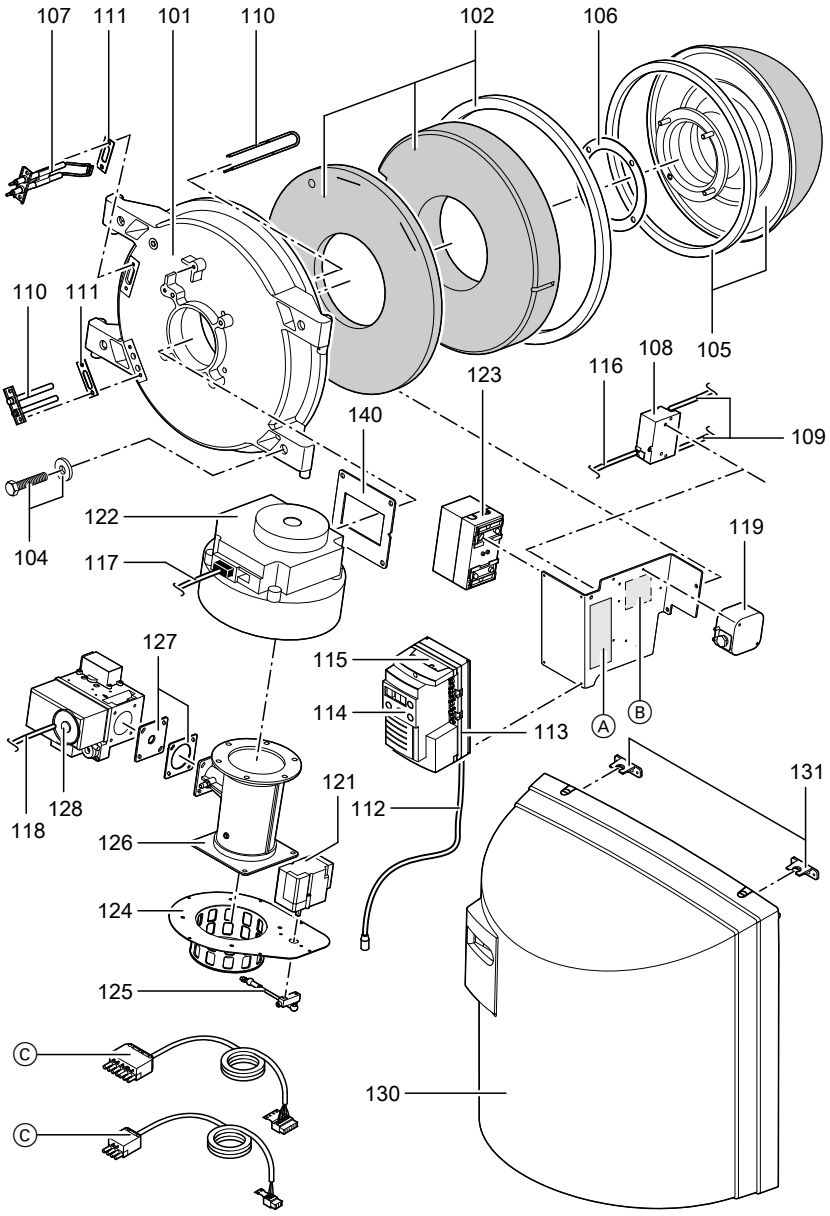
Parts lists (cont.)

MatriX burner 115 to 311 kW



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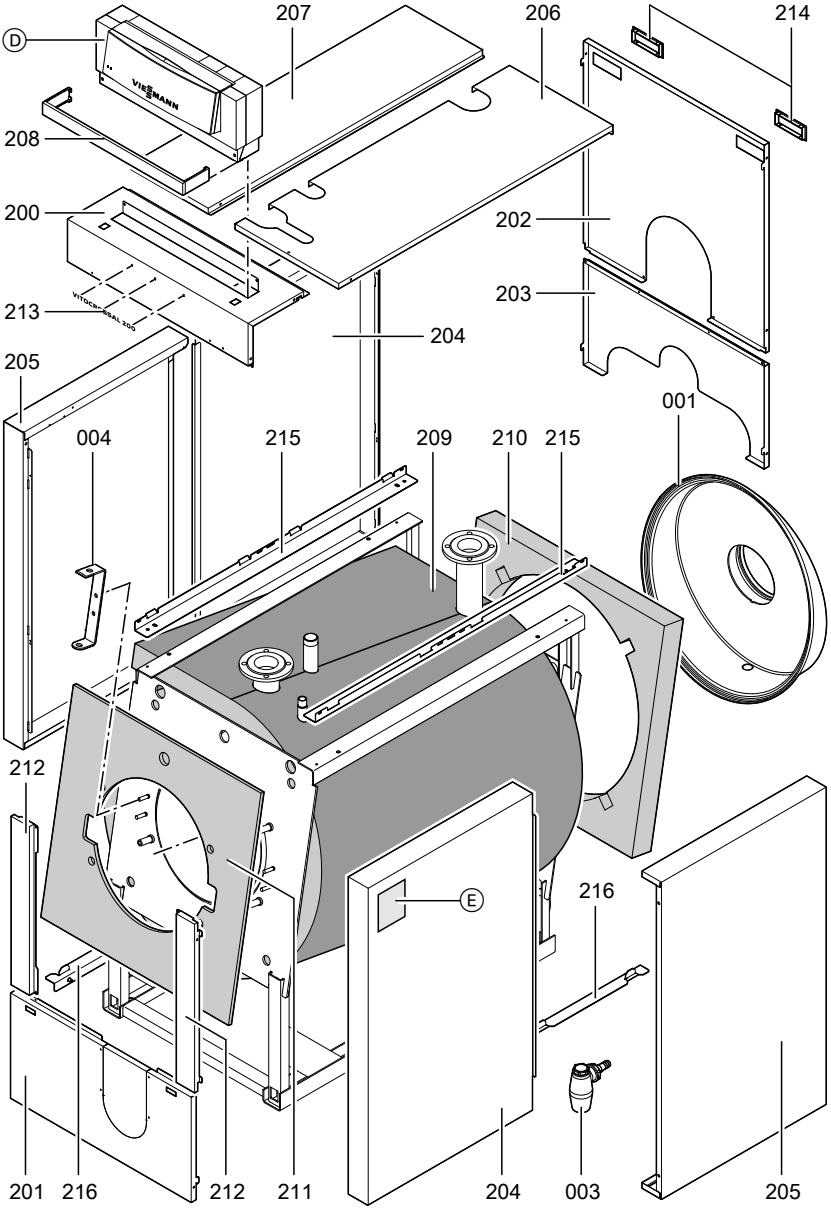
Parts lists (cont.)

Vitocrossal 200, type CM2, 87 to 311 kW



Report

Setting and test values			Commissioning	Maintenance/ Service
Static pressure		*mbar*		
Supply pressure (flow pressure)				
☐ for natural gas E		*mbar*		
☐ for natural gas LL		*mbar*		
Tick gas type				
Carbon dioxide content CO_2				
■ at the upper rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
■ at the lower rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
Oxygen content O_2				
■ at the upper rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
■ at the lower rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
Carbon monoxide content CO	actual	*ppm*		
	set	*ppm*		
Flue gas temperature (gross)	actual	*°C*		
	set	*°C*		
Ionisation current				
■ at the upper rated heating output		*µA*		
■ at the lower rated heating output		*µA*		
Draught	actual	*hPa*		
	set	*hPa*		

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Water quality requirements

Note
Observing the following requirements is necessary to safeguard your warranty rights.

The manufacturer's warranty excludes damage due to corrosion and scaling.

Prevention of damage due to scaling

Prevent excessive scale build-up (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, the VDI Directive 2035 sheet 1 "Prevention of heating system damage – scaling in DHW and hot water heating systems" applies [in Germany] together with the following standard values (see also the relevant explanations in the original directive).

Total heating output kW	**Total of alkaline earths mol/m³**	**Total hardness °dH**
> 50 to ≤ 200	≤ 2.0	≤ 11.2
> 200 to ≤ 600	≤ 1.5	≤ 8.4
> 600	< 0.02	< 0.11

The standard values assume the following:

- The total volume of fill and top-up water during the system's service life will not exceed three times the water content of the heating system.
- The specific system volume is less than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 sheet 2 have been implemented.

Soften the fill and top-up water in heating systems operating under the following conditions:

- The total of alkaline earths in the fill & top-up water exceeds the standard value.
- Higher fill and top-up water volumes are expected.
- The specific system volume is higher than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.

Water quality requirements (cont.)

- In systems > 50 kW, install a water meter to record the volume of the fill & top-up water. Enter the volume of the fill water and the water hardness into the boiler maintenance checklists.
- For systems with a specific system volume in excess of 20 l/kW heating output (apply the output of the smallest boiler in multi boiler systems), apply the requirements of the next highest category of total output (in accordance with the table). In the case of severe excess (> 50 l/kW), soften the water down to a total of alkaline earths of ≤ 0.02 mol/m^3.

Operating information:

- During expansion or repair work, only drain pipework sections that absolutely must be drained.
- Check, clean and activate all filters, dirt traps and other blow-down or separating facilities in the heating water circuit more frequently after commissioning or recommissioning, and later on as required, subject to the water treatment applied (e.g. water softening).
- **No further** steps are required during commissioning, if you fill the heating system **with fully softened water**.
  If the heating system is filled, **not with fully softened water**, but with water that meets the requirements in the above table, **also observe the following during commissioning**:
- Commission the system step by step, starting with the lowest boiler output and a high heating water flow rate. This prevents a localised concentration of limescale deposits on the boiler heating surfaces.
- In multi boiler systems, start all boilers simultaneously to prevent the entire limescale deposit settling in the heat transfer area of just one boiler.
- Where water treatment is required, treat even the first fill of the heating systems prior to commissioning. This also applies to any subsequent filling, e.g. when adding top-up water, or after a repair or system expansion.

The build-up of limescale deposits on the heating surfaces will be minimised if these instructions are observed.
Any limescale deposits that have formed because the requirements to VDI Directive 2035 have not been observed will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the limescale deposits is one option for restoring operational viability.
This measure must be carried out by a specialist. Inspect the heating system for possible damage prior to returning it into use. It is essential that the faulty operating parameters are corrected to prevent renewed formation of excessive scale deposits.

Prevention of damage due to corrosion on the water side

The corrosion resistance of ferrous materials on the heating water side of heating systems and boilers depends on the absence of oxygen in the heating water. The oxygen introduced into the heating system with the first filling and subsequent top-ups reacts with the system materials without causing damage. The characteristic blackening of the water after some time in use indicates that free oxygen is no longer present. The technical rules and in particular VDI Directive 2035-2 therefore recommend that heating systems are designed and operated so that a constant ingress of oxygen into the heating water is prevented.

During operation, oxygen can normally only enter due to:

- Open expansion vessels receiving a flow
- Negative pressure in the system
- Gas-permeable components

Sealed unvented systems– e.g. those equipped with a diaphragm expansion vessel– offer good protection against the ingress of airborne oxygen into the system, if correctly sized and operating at the correct pressure. At every part of the heating system, even at the suction side of the pump and under all operating conditions, the system pressure should be above ambient atmospheric pressure. The pre-charge pressure of the diaphragm expansion vessel should be checked at least during the annual service. The use of permeable components, e.g. plastic pipes that are not diffusion-proof in underfloor heating systems, should be avoided. Provide system separation if such components are nevertheless used. This must separate the water flowing through the plastic pipes from other heating circuits– e.g. from the boiler– by the provision of a corrosion-resistant heat exchanger.

No further anti-corrosion measures are required for sealed unvented hot water heating systems, subject to the above points being observed. However, take additional precautions where there is a risk of oxygen ingress, for example by adding oxygen binder sodium sulphite (5 - 10 mg/l into the excess). The pH value of the heating water should be between 8.2 and 9.5.

Different conditions apply to systems that contain aluminium components.

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Water quality requirements (cont.)

Where chemicals are used as part of the corrosion protection, we recommend that the manufacturer of the chemicals issues a certificate of suitability of the additives with regard to the boiler materials and the materials of the other heating system components. We recommend you refer questions regarding water treatment to an appropriate specialist.
Further details can be found in VDI Directive 2035-2 and EN 14868.

Specification

Gas boiler, category I_{2ELL}

Rated heating output							
T_V/T_R = 50/30 °C	kW	29-87	38-115	47-142	47-186	82-246	104-311
T_V/T_R = 80/60 °C	kW	27-80	35-105	43-130	43-170	75-225	95-285
Rated heat input	kW	27-82	36-108	45-134	44-175	77-232	98-293
Product ID		CE-0085 BQ 0021					
Connection values[*1] relative to the max. load with							
■ Natural gas E	m^3/h	2.8-8.7	3.8-11.5	4.7-14.2	4.6-18.6	8.1-24.6	10.3-31.0
■ Natural gas LL	m^3/h	3.3-10.1	4.4-13.3	5.5-16.5	5.4-21.5	9.4-28.6	12.0-36.1
Product parameters (according to EnEV)							
Efficiency η at							
■ 100 % of rated heating output	%	97.2	97.4	97.6	97.7	97.8	97.8
■ 30 % of rated heating output	%	107.9	108.0	108.0	108.1	108.2	108.2
Standby loss $q_{B,70}$ (boiler)	%	0.6	0.5	0.4	0.4	0.3	0.3
Power consumption at							
■ upper rated heating output	W	85	150	195	280	340	395
■ lower rated heating output	W	35	50	55	55	60	65

[*1] *The connection values are only for reference (e.g. in the gas contract application) or to estimate the volumetric supplementary check of the settings. Because of factory settings, the gas pressures must not be altered from these values. Reference: 15 °C, 1013 mbar*

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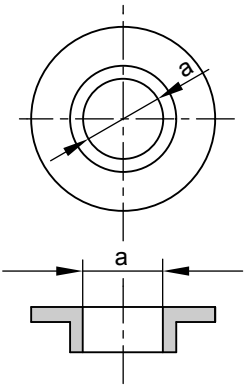
Specification (cont.)

MatriX radiant burner

Rated boiler heating output							
T_V/T_R = 50/30 °C	kW	29-87	38-115	47-142	47-186	82-246	104-311
T_V/T_R = 80/60 °C	kW	27-80	36-105	43-130	43-170	75-225	95-285
Burner type		VMA III-1	VMA III-2	VMA III-3	VMA III-4	VMA III-5	VMA III-6
Voltage	V	230					
Frequency	Hz	50					
Power consumption	W	75	140	185	270	330	385
Motor speed	rpm	4832	4384	5088	5568	5952	6080
Modulation range	%	33-100	33-100	33-100	25-100	33-100	33-100

Gas restrictor dimensions (natural gas E) for 87 kW

Rated heating output	**Dimension a** mm
87 kW	10.7



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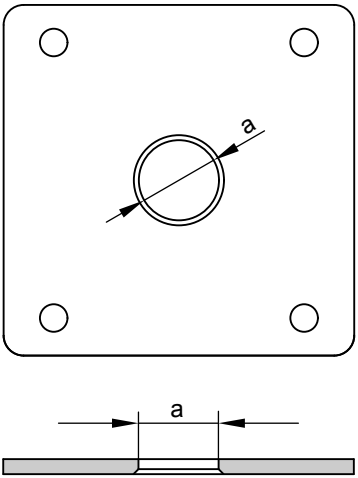
Specification (cont.)

Gas restrictor dimensions (natural gas E) for 115 to 311 kW



Rated heating output	**Dimension a** mm
115 kW	12.9
142 kW	12.9
186 kW	16.0
246 kW	15.7
311 kW	16.8

Declaration of Conformity

We, Viessmann Werke GmbH&Co KG, D-35107 Allendorf, declare as sole responsible body, that the product
Vitocrossal 200, type CM2, 87 to 311 (80 to 285) kW
with Vitotronic boiler control unit and MatriX radiant burner
conforms to the following standards:

DIN EN 303
DIN EN 676
DIN EN 15417
DIN EN 15420
DIN EN 50090-2-2
DIN EN 55014-1
DIN EN 55014-2
DIN EN 60335-1
DIN EN 60335-2-102
DIN EN 61000-3-2
DIN EN 61000-3-3
DIN EN 62233
TRD 702

In accordance with the following Directives, this product is designated with **CE-0085**:

2006/95/EC
2004/108/EC
90/396/EEC

This product meets the requirements of the Efficiency Directive (92/42/EEC) for **condensing boilers**.

The product characteristics determined as system values for the product **Vitocrossal 200, type CM2,** as part of EC type testing according to the Efficiency Directive can be used to assess the energy consumption of heating and ventilation equipment to DIN V 4701-10, as specified by the EnEV [Germany] (see specification table).
This boiler meets the requirements of all current TRD regulations.

Allendorf, 23 November 2009

Viessmann Werke GmbH&Co KG

pp. Manfred Sommer

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Manufacturer's certificate according to the 1st BImSchV

We, Viessmann Werke GmbH&Co KG, D-35107 Allendorf, confirm that the product **Vitocrossal 200, type CM2, 87 to 311 (80 to 285) kW with MatriX radiant burner** complies with the following conditions stipulated by the first German Immissions Order (BImSchV):

- NO_x limits in accordance with para. 6 (1).
- Flue gas loss of max. 9 % in accordance with § 10 (1).

Allendorf, 07 December 2010

Viessmann Werke GmbH&Co KG

pp. Manfred Sommer

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Applicability

Serial No.:

7247420	7247421	7247422	7247423
7247424	7247425	7185861	7185862
7185863	7185864	7185865	7185866

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Printed on environmentally friendly, chlorine-free bleached paper

5692 907 GB Subject to technical modifications.